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Applicant:	Wayne Boga et al.	Date:	March 17, 2008
Date Filed:	February 6, 2004	Docket No.:	METSO-19
App. No.:	10/774,084	Art Unit:	1774
For:	Seal Strip for a Suction Roll and a Method for Manufacturing It	Examiner:	L. Ferguson

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**Appeal Brief**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Dear Sir:

The Commissioner is hereby authorized to charge any additional fees that may be required with respect to this communication, or credit any overpayment, to Deposit Account No. 50-2663.

1. **Real Party In Interest (37 C.F.R. §41.37(c)(1)(i))**

This application is assigned to Metso Paper, Inc. a Finnish corporation having offices at Helsinki, Finland.

2. **Related Appeals And Interferences (37 C.F.R. §41.37(c)(1)(ii))**

There are no related appeals or interferences.

3. **Status of Claims (37 C.F.R. §41.37(c)(1)(iii))**

Claims 1–14 are canceled.

Claims 15–34 stand rejected

Claims 15–34 are appealed.

4. **Status of Amendments (37 C.F.R. §41.37(c)(1)(iv))**

An amendment to claims 15 and 29, filed on March 14, 2008, has not yet been

entered.

5. **Summary of the Claimed Subject Matter (37 C.F.R. §41.37(c)(1)(v))**

(All citations are to the specification, abstract, claims and drawings as originally filed.)

**Independent claims 15 and 30** are to a suction roll seal strip (abstract page 14 line 1) constructed of a material which is sufficiently flexible (page 5, lines 24-25) so that a seal strip with a cross-section of 1.9 cm by 4.8 cm (page 10, lines 1-10) could be bent into a reel with a radius of less than 150 cm, i.e., <1.5m (page 5, lines 22-23). A suction roll seal strip is used in papermaking machines (page 1, lines 10-11) at the interface between a fixed suction box connected to a source of vacuum (page 7, lines 6-7) and a rotating perforated cylindrical roll (page 6, lines 20-21) which is used to extract water from a paper web during its manufacture (page 1, lines 10-11). The problem with the prior art is that the suction roll seal strips are relatively long, 3-12 meters (page 2, lines 9-10), and are made of rigid and brittle material (page 2, lines 14-15) and so shipping and storage is costly, and the brittle material may result in breaking during manufacture, shipping and installation (page 2, lines 17-21). The invention is a seal strip with sufficient flexibility such that the seal strip can be coiled on a reel with a radius of less than 1.5 m (page 5, lines 21-23) thus facilitating shipping (page 5, lines 24-29).

Claim 30 places the suction roll seal strip in a detailed context of use. The suction roll seal strip for placement in a holder (page 6, lines 27-28) of a stationarily supported suction box (page 6, line 20) in a paper machine (page 1, lines 10-11), the suction box being connected to a vacuum source (page 7, lines 6-7), and located inside a perforated cylindrical roll (page 6, lines 20-21) which is mounted for rotation around the suction box (page 6, lines 21-22), wherein the cylindrical roll has an inner surface (page 6, lines 22-23) and wherein the suction box has a gap opening against the cylindrical roll, (page 6, lines 25-26) the suction roll seal strip for positioning within the holder (page 6, lines 27-28) to form a seal between the suction box and the inner surface of the cylindrical roll (FIG. 1 at 22) so that the seal strip wipes against the inner surface of the cylindrical roll as it rotates (page 7, lines 3-4).

**Independent claim 16** and claims dependent therefrom are directed to a suction roll seal strip comprising a mixture of more than 50% (i.e., mostly) nitrile rubber and graphite, (page 4, lines 22-24) and said mixture containing wax (page 4, lines 24-25)

**Claims 17, 26, and 31–32 are argued separately** and include the limitation sufficiently flexible (page 5, lines 24-25) so that a seal strip with a cross-section of 1.9 cm by 4.8 cm (page 10, lines 1-10) could be bent into a reel with a radius of less than 150 cm i.e., <1.5m (page 5, lines 22-23).

**Claims 24–25, 27–29 and 33–34 are argued separately** and include a wax with the melting temperature of more than 100°C (Page 5, lines 19-20).

**Claims 33–34 are again argued separately** and include the limitation sufficiently flexible (page 5, lines 24-25) so that a seal strip with a cross-section of 1.9 cm by 4.8 cm (page 10, lines 1-10) could be bent into a reel with a radius of less than 150 cm i.e., <1.5m (page 5, lines 22-23) and include a material of the seal containing wax with a melting temperature of more than 110°C (page 5, lines 19-20).

6. **Grounds of Rejection to Be Reviewed on Appeal (37 C.F.R. §41.37(c)(1)(vi))**

Whether claims 15 and 30 are unpatentable under 35 U.S.C. 103(a) as being obvious over Persson et al. (U.S. 6,436,241).

Whether claims 16–23, 26 and 31–32 are unpatentable under 35 U.S.C. 103(a) as being obvious over Persson et al. (U.S. 6,436,241) in view of Selover, Jr. et al. (U.S. 4,014,730).

Whether claims 24–25, 27–29 and 33–34 are unpatentable under 35 U.S.C. 103(a) as being obvious over Persson et al. (U.S. 6,436,241) in view of Selover, Jr. et al. (U.S. 4,014,730) further in view of Sale et al. (U.S. 6,258,409).

7. **Argument (37 C.F.R. §41.3(c)(1)(vii))**

**Discussion of References Applied by the Examiner**

**Persson et al.** (U.S. 6,436,241) discloses a suction roll seal strip, manufactured of a

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graphite, preferably a mixture of rubber and graphite, or other conceivable polymeric materials, for example, plastic or Teflon. (Column 3, lines 58–62).

**Selover, Jr. et al.** (U.S. 4,014,730) describes a rubber-impregnated graphite connector, where the impregnating rubber includes paraffin wax (column 5, lines 45–55). The added waxes are described as “usual vulcanizing agents” (column 3, lines 3–4). The connector is part of an electrical capacitor (column 1, lines 11–13 and FIG. 2)., and “the primary functions of the connector 14 are as current collector and as an inter-cell ionic insulator.” (column 3, lines 40–41).

**Sale et al.** (U.S. 6,258,409) describes a filter sheet having its edges sealed with wax (preferably ethylene bis-stearamide wax) which has a melting point of about 110° C to about 180° C (column 1, lines 9–19). Ethylene bis-stearamide wax (column 7, line 5) is the wax applicants claim as comprising part of material of the suction roll seal strip of claims 27 and 34.

### **Patentability of Claims 15 and 30**

**Claims 15 and 30** stand rejected as obvious over Persson et al. (U.S. 6,436,241) because the examiner has failed to give patentable weight to the claim limitation “*to allow a seal with a cross-section of 1.9 cm by 4.8 cm to be bent into a reel with a radius of less than 150 cm*”. The examiner states that this limitation “constitutes a ‘capable of’ limitation and that such a recitation that an element is ‘capable of’ performing a function is not a positive limitation but only requires the ability to so perform.” (Page 3, lines 2–6, Final Office Action dated Oct. 18, 2007.)

**Issue 1: Must applicants’ claim limitation “*comprised of a material selected to allow a seal with a cross-section of 1.9 cm by 4.8 cm to be bent into a reel with a radius of less than 150 cm*” be given patentable weight?**

A ‘capable of’ limitation is a functional limitation which the MPEP states is permissible: MPEP 2173.05(g) Functional Limitations [R-3]

A functional limitation is an attempt to define something by what it does, rather than by what it is (e.g., as evidenced by its specific structure or specific ingredients). There is nothing inherently wrong with defining some part of an invention in functional terms. Functional language does not, in and of itself, render a claim improper. In re Swinehart, 439 F.2d 210, 169 USPQ 226 (CCPA 1971).

A functional limitation must be evaluated and considered, just like any other limitation of the claim, for what it fairly conveys to a person of ordinary skill in the pertinent art in the context in which it is used. A functional limitation is often used in association with an element, ingredient, or step of a process to define a particular capability or purpose that is served by the recited element, ingredient or step.

The reasonableness of claiming something based on what it is ‘capable of’ can be seen from a few simple examples:

- a limitation to *a steel plate with a yield strength of 70,000 pounds per square inch*, is a limitation to a steel plate made of steel which can support 70,000 pounds per square inch before yielding.
- a limitation to *an oxidization resistant steel plate*, is the limitation to a steel plate which resists oxidation.
- a limitation to *a spring with a spring constant of one pound per inch* is a limitation to a spring that stretches 1 inch for every pound applied.

Applicants’ claim limitation “*a material selected to allow a seal strip with a cross-section of 1.9 cm by 4.8 cm to be bent into a reel with a radius of less than 150 cm, said material defining the suction roll seal strip*,” is a limitation to a suction roll seal strip, limiting the seal strip to one formed of a material which is sufficiently flexible that a seal strip with a section of 1.9 cm by 4.8 cm can be bent into a reel with a radius of less than 150 cm. If applicants had specified the durometer (hardness) of the material of the suction roll seal strip it would clearly be a limitation to the claims, but applicants are free to choose how they define their invention. Here applicants choose to claim the invention in a way which captures

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the benefit applicants disclose of lowering shipping cost of the suction roll seal strip by shipping it coiled on a reel with a radius of less than 150 cm.

**Issue 2: Has the examiner made a prima facie case of obviousness?**

Applicants here consider the examiner's basis for a prima facie case of obviousness under KSR International Co. as articulated in MPEP §2142–§2144.02 8<sup>th</sup> ed., Rev. No. 6.

MPEP §2142 Rev. 6 states that “The examiner bears the initial burden of factually supporting any *prima facie* conclusion of obviousness.” The U.S. Supreme Court in *KSR International Co. v. Teleflex Inc.* sets forth the standard for supporting an examiner's finding of obviousness:

To facilitate review, this analysis should be made explicit. See *In re Kahn*, 441 F.3d 977, 988 (C.A.Fed.2006) (“[R]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness”).

*KSR Intern. Co. v. Teleflex Inc.* 127 S.Ct. 1727, 1741 (U.S., 2007)

The examiner's entire basis for his prima facie case is stated as:

Although Persson does not teach cross section, radius or flexibility of the seal material, it would have been obvious to one of ordinary skill in the art to include these features *because Persson teaches the same materials having the same function as applicants claimed invention*. With respect to the claimed teach [*sic*] cross section, radius and flexibility of the composite laminate, *these features are directly related to the specific mixture used*. [Emphasis added.]

(page 3, lines 7–12, Final Office Action dated Oct. 18, 2007.)

The examiner's first basis of rejection is “...*Persson teaches the same materials having the same function as applicants claimed invention*.” Yet this directly contradicts the beginning of the same sentence “...Persson does not teach cross section, radius or flexibility of the seal material...”. Applicants are claiming the material of the seal functionally, the material as claimed is either present in Persson or it is not present. If the examiner believes

the claimed material is present in Persson, a rational basis for that conclusion must be stated.

And the examiner's second basis for his finding is that "*these features* [cross section, radius and flexibility] *are directly related to the specific mixture used.*" But this statement is no more than a truism. Applicants are using these features to claim the specific mixture used. So, while the examiner is explaining what applicants have done with the claim language, the statement has no rational relation as to whether the prior art renders applicants' claimed invention obvious.

### **Patentability of Claims 16-23, 26 and 31-32**

**Claims 16–23, 26 and 31–32** are directed to a suction roll seal strip "comprising a mixture of more than 50% nitrile rubber and graphite, and said mixture containing wax". The examiner admits that "Persson does not disclose a wax in the rubber and graphite mixture." However, the examiner argues that Selover, Jr. et al. teaches a sealant, containing rubber, graphite and wax, and that "it would have been obvious to one of ordinary skill in the art to have employed the wax and sulfur at the weight percentages, as taught in Selover, Jr. et al., in the seal strip of Persson because *when a patent simply arranges old elements with each performing the same function it had been known to perform and yields no more than one would expect from such an arrangement, the combination is proper.*" [Emphasis added.] (page 4, lines 6–11, Final Office Action dated Oct. 18, 2007.)

### **Issue 3: Has the examiner articulated reasoning with some rational underpinning to support combining the teachings of Persson and Selover, Jr. et al.?**

The prior art teaches suction roll sealing strips composed of rubber and graphite about which applicants' specification teaches "[t]he nature of the material is that it is a rigid, brittle structure." (page 2, lines 13-15) Applicants teach forming the suction roll sealing strips of a material which is made flexible by adding wax to a mixture of rubber and graphite. Persson et al. teaches—what applicants have admitted—that graphite rubber suction roll seal strips are known. Selover Jr. et al. teaches an impervious electrically conductive connector for use in an

electrical capacitor, (column 1, lines 11–13) composed of a graphite sheet impregnated with rubber which contains paraffin wax. “The primary functions of the connector 14 are as a current collector and the inter-cell ionic insulator.” (column 3, lines 40–41)

There is nothing in Selover Jr. et al. which teaches applicants’ claimed invention to a suction roll sealing strip. MPEP 2141.01(a) sets forth the basic rule – *In order to rely on a reference as a basis for rejection of an applicant's invention, the reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the inventor was concerned.* It is to be noted that neither the classification nor the field of search overlaps between Persson et al. and Selover, Jr. et al. Thus the examiner must set forth how the reference is relevant to the particular problem the inventors were concerned with, i.e., increasing the flexibility of a suction roll seal strip.

In Selover, Jr. a mixture of carbon black and rubber containing 2 parts paraffin wax per 100 parts of rubber is given. However, carbon black does not read on graphite, which is disclosed by applicants as having lubricating properties in combination with rubber (specification page 3, lines 22–24). Carbon black is **not** shown by the examiner to impart lubricating properties, although it is used in combination with graphite as a reinforcing agent in suction roll seals (see US 5,876,566, column 3, lines 24–25). Further, the mixture with carbon black shown in Selover, Jr. is not suggested for use in the connector of Selover, Jr. or as a seal but simply as an example of an electrical conductive mixture of rubber and carbon black.

At most, Selover, Jr. et al. simply teaches that wax is sometimes used as an additive in the formulation of rubber. But the examiner is not free to simply pick and choose from the prior art the elements of applicants’ claimed invention, using applicants’ claims as a blueprint. See *Sensonics Inc. v. Aerosonic Corp.*, 38 USPQ2d 1551, 1554 (Fed. Cir. 1996). The examiner argues that “Persson and Selover, Jr. et al. are combinable because they are related to a similar technical field, which is sealant” (page 4, lines 5–6, Final Office Action dated Oct. 18, 2007.) but as explained above, the claimed suction roll seal strip, and the connector (seal) of Selover, Jr. are in fact unrelated. Simply calling the connector of Selover,



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Jr. a seal does not amount to some articulated reasoning with some rational underpinning (see *Supra KSR Intern. Co.*) for why a person of ordinary skill in the art would add a wax to the suction roll seal strip of Persson.

**Patentability of Claims 17, 26, and 31–32 argued separately**

Claims 17, 26, and 31–32 combine the addition of wax to the material from which the suction roll seal strip is formed with the requirement that the seal material allow a seal strip with a cross-section of 1.9 cm by 4.8 cm to be bent into a reel with a radius of less than 150 cm or 130 cm. Thus claims 17, 26, and 31–32 require more than that a certain amount of wax be present, but that the material incorporating the wax achieve a certain level of flexibility.

The examiners reasons:

Therefore, it would have been obvious to one of ordinary skill in the art to have employed the wax and sulfur at the weight percentages, as taught in Selover, Jr., in the seal strip of Persson because when a patent simply arranges old elements with each performing the same function it had been known to perform and yields no more than one would expect from such an arrangement, the combination is proper.”

(page 4, lines 6–11, Final Office Action dated Oct. 18, 2007)

However there is nothing in the references of record that suggests that the addition of wax to a suction roll seal strip formed of graphite and rubber will render the seal strip sufficiently flexible such that a seal strip with a cross-section of 1.9 cm by 4.8 cm can be bent into a reel with a radius of less than 150 cm or 130 cm. In addition, the examiner has articulated no reasoning and no rational underpinning for why the person of ordinary skill in the art would add wax to the known composition of graphite and rubber such that a suction roll seal strip with the claimed flexibility is produced.

**Patentability of Claims 24–25, 27–29 and 33–34**

**Issue 4: Has the examiner articulated reasoning with some rational underpinning to support combining the teachings of Persson, Selover, Jr., and Sale et al.?**

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The examiner implicitly admits that paraffin wax (Paraffin which has a typical melting point between about 47 °C and 64 °C.” <http://en.wikipedia.org/wiki/Paraffin>) as disclosed by Selover, Jr, does not meet the limitation of temperature or composition required by claims 24–25, 27–29 and 33–34 (page 4, lines 16–17, Final Office Action dated Oct. 18, 2007). Sale et al. (which again has no classification or search overlap with Persson et al.) teaches nothing more than that the wax ethylene bis-stearamide can be used for sealing the perimeter of a filter sheet, i.e., shows the use of applicants’ preferred wax (ethylene bis-stearamide) for sealing the edge of a filter sheet. The fact that any wax is used as a sealant is hardly surprising, but Sale et al. teaches no more than the existence of a wax claimed, something inherently admitted by the specification. The examiner’s stated rationale for why Sale et al. can be combined with Persson et al. and Selover, Jr. et al. is “...because the ethylene bis-stearamide wax retains the integrity of the seal.” (page 5, lines 3–4, Final Office Action dated Oct. 18, 2007) makes no sense. The benefits of the wax alone as a seal says nothing about any motivation, or reason for combining this particular wax with rubber and graphite to form a suction roll seal strip. Applicants’ claims are to a suction roll seal strip composed of graphite, rubber and wax where the wax is added to make the seal more flexible. Sale et al. discloses no relation to a suction roll seal strip, or to the benefits of using ethylene bis-stearamide wax to make a composition of graphite and rubber more flexible, or for any other reason for combining Sale et al with the teachings of Persson, and Selover, Jr. The mere existence of a wax conforming to the claims does not provide some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness (see *Supra KSR Intern. Co.*).

#### **Patentability of Claims 33–34 argued separately**

Claims 33–34 combine the addition of a wax meeting limitations of temperature or composition with the requirement that the seal material allow a seal strip with a cross-section of 1.9 cm by 4.8 cm to be bent into a reel with a radius of less than 150 cm. Thus claims 33–34 require more than that a wax meeting the limitations of temperature or composition be

present, but that the material incorporating the wax achieve a certain level of flexibility in a suction roll seal strip.

The examiner has articulated no reasoning and no rational underpinning for why the person of ordinary skill in the art would add a wax meeting limitations of temperature or composition to the known composition of graphite and rubber such that a suction roll seal strip with the claimed flexibility is produced.

**E. Summary of Argument**

The examiner has improperly failed to give patentable weight to the claim limitation *“comprised of a material selected to allow a seal with a cross-section of 1.9 cm by 4.8 cm to be bent into a reel with a radius of less than 150 cm”* as required by MPEP 2173.05(g). In not considering the foregoing limitation, the examiner has completely foregone *any* argument with respect to why the prior art makes such a flexible suction roll seal strip obvious.

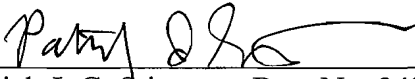
Beyond what is taught by the application, the examiner has found only one possibly relevant fact—that it is known to add wax (paraffin) to formulations of rubber. But the fact that wax (paraffin) can be added to rubber leads nowhere because the examiner has not shown, in the prior art or by argument, a suggest to adding wax (paraffin) to the material forming a suction roll seal strip, or a suggest that such an addition of wax would provide any benefit in a suction roll seal strip. More particularly the examiner has failed, to articulate reasoning with some rational underpinning why wax would be added to the material making

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up a suction roll seal strip, to make the seal flexible enough *“to allow a seal with a cross-section of 1.9 cm by 4.8 cm to be bent into a reel with a radius of less than 150 cm”*, and yet more particularly why wax of the claimed, type, and melting temperature would be added to a suction roll seal strip.

Respectfully submitted,

March 17, 2008 (3:24pm)

  
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**Claims Appendix (37 C.F.R. §41.3(c)(1)(viii))**

15. A suction roll seal strip, comprised of a material selected to allow a seal strip with a cross-section of 1.9 cm by 4.8 cm to be bent into a reel with a radius of less than 150 cm, said material defining the suction roll seal strip.

16. A suction roll seal strip, comprising a mixture of more than 50% nitrile rubber and graphite, and said mixture containing wax, the mixture being formed into the suction roll seal strip.

17. The seal strip of claim 16, wherein an amount of wax in the mixture is set so that the flexibility of the seal strip when it has a cross-section of 1.9 cm by 4.8 cm permits the seal strip to be bent onto a reel, having a radius of less than 130 cm.

18. The suction roll seal strip of claim 16 wherein the mixture includes 1–15% wax by volume.

19. The suction roll seal strip of claim 18 wherein the mixture includes 2–4% wax by volume.

20. The suction roll seal strip of claim 16 wherein the mixture includes an amount of nitrile rubber of 30–60% by volume, and an amount of graphite 30–60% by volume.

21. The suction roll seal strip of claim 16 wherein the mixture includes 1–15% sulphur or peroxide by mass.

22. The suction roll seal strip of claim 16 wherein the graphite in the mixture is natural graphite.

23. The suction roll seal strip of claim 16 wherein the graphite in the mixture is synthetic graphite.

24. The suction roll seal strip of claim 16 wherein the wax in the mixture has a melting point more than 100 ° C.

25. The suction roll seal strip of claim 16 wherein the wax in the mixture has a melting point within the range 110–150 ° C.

26. The suction roll seal strip of claim 16 wherein the amount of wax is selected such that a seal strip, with a cross-section of 1.9 by 4.8 cm can be rolled onto a reel with a radius of less than 1.5 m.

27. The suction roll seal strip of claim 16 wherein the wax in the mixture is an ethylene bis-stearamide wax.

28. The suction roll seal strip of claim 27 wherein the wax in the mixture is a N, N'-ethylene bis-stearamide wax.

29. The suction roll seal strip of claim 16 wherein the wax in the mixture is a wax selected from the group consisting of: hydroxy stearamide wax, hydroxy bis-stearamide wax, carnauba wax, esparto wax, polyolefin wax, and amide wax

30. A suction roll seal strip for placement in a holder of a stationarily supported suction box in a paper machine, the suction box being connected to a vacuum source, and located inside a perforated cylindrical roll which is mounted for rotation around the suction box, wherein the cylindrical roll has an inner surface and wherein the suction box has a gap opening against the cylindrical roll, the suction roll seal strip for positioning within the holder to form a seal between the suction box and the inner surface of the cylindrical roll so that the seal strip wipes against the inner surface of the cylindrical roll as it rotates, the suction roll seal strip comprising: a section of material selected to allow a seal strip with a cross-section of 1.9 cm by 4.8 cm to be bent into a reel with a radius of less than 150 cm.

31. The suction roll seal strip of claim 30 wherein the seal strip is comprised of a mixture of more than 50% nitrile rubber and graphite, and contains wax.

32. The suction roll seal strip of claim 31 wherein the mixture includes 1–15% wax by volume.

33. The suction roll seal strip of claim 32 wherein the wax in the mixture has a melting point within the range of 110–150 ° C.

34. The suction roll seal strip of claim 33 wherein the wax in the mixture is a wax selected from the group consisting of: ethylene bis-stearamide wax, hydroxy stearamide wax, hydroxy bis-stearamide wax, carnauba wax, esparto wax, polyolefin wax, and amide wax.

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**Evidence Appendix (37 C.F.R. §41.3(c)(1)(ix))**

None



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**Related Proceedings Appendix (37 C.F.R. §41.3(c)(1)(x))**

None